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## PATENT ABSTRACTS OF JAPAN

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**F02M 65/00**(21) Application number: **55015483**(71) Applicant: **NISSAN MOTOR CO LTD**(22) Date of filing: **13.02.80**(72) Inventor: **YASUHARA SHIGEFUMI**(54) **INJECTION TIMING SENSOR**

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(57) Abstract:

**PURPOSE:** To sense accurately injection timing of a fuel injection valve by providing a sensor arranged in a nozzle holder of the valve and having a piezo-electric element conducting electricity when spring force is applied thereto.

**CONSTITUTION:** A needle valve 8, a nozzle 3 having an injection port 6 opened and closed by the needle valve 8 and a nozzle holder 10 are integrally incorporated in a nozzle nut 1 threaded into a cylinder head 20. On the holder 10 are mounted a spring seat 14 engaging on one end with the needle valve 8 and receiving on the other end a spring 15 and a lift sensor 17 engaging the other end of the spring 15. The sensor 17 is assembled by sequentially arranging an earth plate 25 engaging the spring 15, a piezo-electric element 21 having the upper and lower silver-vaporized layers 21a, a conductive plate 22 and a terminal rod 18 surrounded by an insulator 23. When the needle valve 8 moves upward and the spring force is transmitted to the element 21, the sensor takes out a signal assuming the injection port 6 is opened.

